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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,321	OKABE ET AL.	
	Examiner	Art Unit	
	Thomas M. Redding	2624	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/26/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because it contains more than one paragraph. Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Applicant is advised that should claim 4 be found allowable, claim 14 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicant is advised that should claim 8 be found allowable, claim 16 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicant is advised that should claim 12 be found allowable, claim 18 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicant is advised that should claim 13 be found allowable, claim 19 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim1, 2, 4-6, 9, 10, 14, 15, 20, 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamamatsu et al. (US 2001/0048761).

Regarding claim 1, Hamamatsu discloses [a] method of inspecting defects, comprising: a step of assigning an inspection recipe ("an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45);

a step of inspecting a sample using the inspection recipe assigned ("the inspection apparatus can perform an inspection on the sample 1 to be inspected under the set optimal inspection condition", Hamamatsu, paragraph 45); and

a step of outputting results of the inspection; (Hamamatsu, figure 1, reference 61, Hamamatsu displays his results);

wherein said step of assigning an inspection recipe further includes:

an image signal acquisition step in which images of a sample are each sequentially acquired under a plurality of sets of image acquisition conditions differing from each other and a plurality of image signals each different in image acquisition conditions are acquired ("This group 10 of inspections includes the following inspection processes: (a) inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm), and the like by the use of the same inspection apparatus; (b) inspections are performed on the sample by the use of a plurality of inspection apparatuses of the same kind or approximately the same kind; (c) inspections are performed on the sample by the use of inspection apparatuses of different kinds (for example, an optical inspection apparatus shown in FIG. 2, an optical inspection apparatus shown in FIG. 3, an optical inspection apparatus shown in FIG. 4, or a SEM appearance inspection apparatus)", Hamamatsu, paragraph 41);

a defect detection step in which, from each of the plurality of image signals sequentially acquired under different sets of image acquisition conditions in said image signal acquisition step, defect candidates are detected for each of the plurality of sets of image acquisition conditions, and position information of the defect candidates detected is acquired ("Next, the CPU 110a compares the coordinates of the detected particles of a plurality of inspection data obtained under the respective inspection conditions to

judge the identity of the positions of the detected particles and checks the plurality of inspection data based on the identity judgment and stores the data 31a of the results of check (data after the identity judgment) in an internal memory (not shown) or the storage device 113", Hamamatsu, paragraph 73);

an OR file-creating step in which, on the basis of position information of the defect candidates detected under each of the plurality of sets of image acquisition conditions in said defect detection step, an OR file of defect candidates is created for each of the plurality of sets of image acquisition conditions ("stores the data 31a of the results of check (data after the identity judgment) in an internal memory (not shown) or the storage device 113", Hamamatsu, paragraph 73, and figure 5, reference 113a, Hamamatsu shows position information is key information stored in the file) ; and

a reviewing step in which, on the basis of the OR file of defect candidates that was created for each of the plurality of sets of image acquisition conditions in said OR file-creating step, the same defect candidate is reviewed only one time ("In this manner, the identity judgment processing 30 performed on the group of inspection data 11 largely decreases the number of detected particles in the data 31 after the identity judgment processing 30 by the number of data judged to be identical. In the analysis processing 40, the detected particles, largely decreased in number, are analyzed (reviewed) in detail by various kinds of analysis processes and are classified by category", Hamamatsu, paragraph 43, Hamamatsu, by consolidating identical particles, avoids looking at the same defect more that once).

Regarding claim2, Hamamatsu discloses wherein:

in said defect detection step, on the basis of assigned inspection conditions, defect candidates for each of said image acquisition signals are each detected from the image signals sequentially acquired therefrom ("A group of inspection data 11 is obtained as a set as the results of inspections from the respective inspections in the group 10 of plural kinds of inspections performed on a sample to be inspected having a surface condition made by a certain manufacturing process", Hamamatsu, paragraph 42, the inspection data is later classified by category "In the analysis processing 40, the detected particles, largely decreased in number, are analyzed (reviewed) in detail by various kinds of analysis processes and are classified by category (for example, foreign substance, false information, circuit pattern defect, scratch (flaw), and the like) to produce a group 41 of analysis data", Hamamatsu, paragraph 43, inspection data are potential defects that are refined by analysis).

Regarding claim 4, and by duplication claim 14, Hamamatsu discloses [a] method of inspecting defects, comprising: a step of assigning an inspection recipe ("an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45);

a step of inspecting a sample using the inspection recipe assigned ("the inspection apparatus can perform an inspection on the sample 1 to be inspected under the set optimal inspection condition", Hamamatsu, paragraph 45); and

a step of outputting results of the inspection (Hamamatsu, figure 1, reference 61, Hamamatsu displays his results);

wherein said step of assigning an inspection recipe further includes:

an image signal acquisition step in which images of a sample are each sequentially acquired under a plurality of sets of image acquisition conditions differing from each other and a plurality of image signals each different in image acquisition conditions are acquired ("This group 10 of inspections includes the following inspection processes: (a) inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm), and the like by the use of the same inspection apparatus; (b) inspections are performed on the sample by the use of a plurality of inspection apparatuses of the same kind or approximately the same kind; (c) inspections are performed on the sample by the use of inspection apparatuses of different kinds (for example, an optical inspection apparatus shown in FIG. 2, an optical inspection apparatus shown in FIG. 3, an optical inspection apparatus shown in FIG. 4, or a SEM appearance inspection apparatus)", Hamamatsu, paragraph 41);

a defect detection step in which, from each of the plurality of image signals sequentially acquired under different sets of image acquisition conditions in said image signal acquisition step, defect candidates are detected for each of the plurality of sets of

image acquisition conditions, and position information of the defect candidates detected is acquired ("Next, the CPU 110a compares the coordinates of the detected particles of a plurality of inspection data obtained under the respective inspection conditions to judge the identity of the positions of the detected particles and checks the plurality of inspection data based on the identity judgment and stores the data 31a of the results of check (data after the identity judgment) in an internal memory (not shown) or the storage device 113", Hamamatsu, paragraph 73);

an OR file-creating step in which, on the basis of position information of the defect candidates detected under each of the plurality of sets of image acquisition conditions in said defect detection step, an OR file of defect candidates is created for each of the plurality of sets of image acquisition conditions ("stores the data 31a of the results of check (data after the identity judgment) in an internal memory (not shown) or the storage device 113", Hamamatsu, paragraph 73, and figure 5, reference 113a, Hamamatsu shows position information is key information stored in the file);

a classification step in which, on the basis of the OR file of defect candidates that was created for each of the plurality of sets of image acquisition conditions in said OR file-creating step, defect candidates for each of the plurality of sets of image acquisition conditions are each classified into different types without the same defect candidate being repeatedly classified ("In this manner, the identity judgment processing 30 performed on the group of inspection data 11 largely decreases the number of detected particles in the data 31 after the identity judgment processing 30 by the number of data judged to be identical. In the analysis processing 40, the detected

particles, largely decreased in number, are analyzed (reviewed) in detail by various kinds of analysis processes and are classified by category (for example, foreign substance, false information, circuit pattern defect, scratch (flaw), and the like) to produce a group 41 of analysis data", Hamamatsu, paragraph 43); and

a selection step in which, on the basis of the classification results obtained for each of the plurality of sets of image acquisition conditions in said classification step, image acquisition conditions are selected and assigned as an inspection recipe in said defect inspection tool in accordance with conditions selection criteria ("By displaying the group 51a of inspection data, for example, on the display device unit 61, an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45).

Regarding claim 5, Hamamatsu discloses wherein:
in said defect detection step, on the basis of assigned inspection conditions, defect candidates for each of said sets of image acquisition conditions are each detected from the image signals sequentially acquired thereunder (Hamamatsu figure 1, reference 40 and 41, Hamamatsu processes the candidate defect particles that came from the acquisition conditions, reference 10 and 11).

Regarding claim 6, Hamamatsu discloses wherein:

in said classification step, the classification of the defect candidates for each of said sets of image acquisition conditions is performed on the basis of reviewing ("the detected particles, largely decreased in number, are analyzed (reviewed) in detail by various kinds of analysis processes and are classified by category (for example, foreign substance, false information, circuit pattern defect, scratch (flaw), and the like) to produce a group 41 of analysis data", Hamamatsu, paragraph 43).

Regarding claim 9, Hamamatsu discloses wherein:

in said classification step, the classification of the defect candidates for each of said sets of image acquisition conditions is performed using results of defect component analysis ("by analyzing the sample to be inspected, which is reviewed and classified, by means of a mass spectrometer or an X-ray spectrometer, the material of the foreign substance is analyzed into Al, Si, Cu, and unknown", Hamamatsu, paragraph 83 and "FIG. 13 is an illustration to show the results of analysis of the materials of foreign particles and the like", Hamamatsu, paragraph 30, and figure 13).

Regarding claim 10, Hamamatsu discloses wherein:

in said selection step, a criterion that assigns priority to a particular category during the classification of defects is provided as part of said conditions selection criteria ("the inspection conditions B and C have little false information and hence can be selected as optimal inspection conditions on the screen of the display device 112 by the use of the

input device 111.", Hamamatsu, paragraph 82, Hamamatsu teaches setting priority based on how effective a given configuration proved to be).

Regarding claim 15, Hamamatsu discloses wherein:

in said selection step, at least a criterion that assigns priority to sensitivity ("the inspection conditions B and C have little false information and hence can be selected as optimal inspection conditions on the screen of the display device 112 by the use of the input device 111.", Hamamatsu, paragraph 82, Hamamatsu teaches setting priority based on how effective a given configuration proved to be), and a criterion that minimizes false defects are provided as part of said conditions selection criteria ("if the threshold is low, small defects can be detected, but false information increases, and if the threshold is high, only large defects can be detected. As a result, also in the threshold map, there is an optimal condition for the underlying condition", Hamamatsu, paragraph 64).

Regarding claim 20, Hamamatsu discloses [a] method of inspecting defects, comprising:

a step of assigning an inspection recipe ("an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45);

a step of inspecting a sample using the inspection recipe assigned ("the inspection apparatus can perform an inspection on the sample 1 to be inspected under the set optimal inspection condition", Hamamatsu, paragraph 45); and

a step of outputting results of the inspection (Hamamatsu, figure 1, reference 61, Hamamatsu displays his results);

wherein said step of assigning an inspection recipe further includes:

an image signal acquisition step in which, in a defect inspection tool, an image signal is acquired from a required sample ("This group 10 of inspections includes the following inspection processes: (a) inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm), and the like by the use of the same inspection apparatus; (b) inspections are performed on the sample by the use of a plurality of inspection apparatuses of the same kind or approximately the same kind; (c) inspections are performed on the sample by the use of inspection apparatuses of different kinds (for example, an optical inspection apparatus shown in FIG. 2, an optical inspection apparatus shown in FIG. 3, an optical inspection apparatus shown in FIG. 4, or a SEM appearance inspection apparatus)", Hamamatsu, paragraph 41);

a defect detection step in which, from the image signal acquired in said image signal acquisition step, defect candidates are each detected on the basis of desired inspection conditions ("Next, the CPU 110a compares the coordinates of the detected particles of a plurality of inspection data obtained under the respective inspection conditions to judge the identity of the positions of the detected particles and checks the

plurality of inspection data based on the identity judgment and stores the data 31a of the results of check (data after the identity judgment) in an internal memory (not shown) or the storage device 113", Hamamatsu, paragraph 73);

a classification step in which the defects candidate detected in said defect detection step are classified into different types ("In this manner, the identity judgment processing 30 performed on the group of inspection data 11 largely decreases the number of detected particles in the data 31 after the identity judgment processing 30 by the number of data judged to be identical. In the analysis processing 40, the detected particles, largely decreased in number, are analyzed (reviewed) in detail by various kinds of analysis processes and are classified by category (for example, foreign substance, false information, circuit pattern defect, scratch (flaw), and the like) to produce a group 41 of analysis data", Hamamatsu, paragraph 43); and

a selection step in which, on the basis of the classification results obtained in said classification step, inspection conditions are selected or adjusted and assigned as an inspection recipe for the defect inspection tool in accordance with conditions selection criteria ("By displaying the group 51a of inspection data, for example, on the display device unit 61, an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45).

Regarding claim 22, Hamamatsu teaches [a] method of inspecting defects, comprising:

a step of assigning an inspection recipe ("an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45);

a step of inspecting a sample using the inspection recipe assigned ("the inspection apparatus can perform an inspection on the sample 1 to be inspected under the set optimal inspection condition", Hamamatsu, paragraph 45); and

a step of outputting results of the inspection (Hamamatsu, figure 1, reference 61, Hamamatsu displays his results);

wherein said step of assigning an inspection recipe further includes:

an image signal acquisition step in which, in a defect inspection tool, by varying a plurality of sets of image acquisition conditions differing from each other, image signals for each of said sets of image acquisition conditions are sequentially acquired from a required sample ("This group 10 of inspections includes the following inspection processes: (a) inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm), and the like by the use of the same inspection apparatus; (b) inspections are performed on the sample by the use of a plurality of inspection apparatuses of the same kind or approximately the same kind; (c) inspections are performed on the sample by the use of inspection apparatuses of

different kinds (for example, an optical inspection apparatus shown in FIG. 2, an optical inspection apparatus shown in FIG. 3, an optical inspection apparatus shown in FIG. 4, or a SEM appearance inspection apparatus)",. Hamamatsu, paragraph 41);

a step in which the image signals sequentially acquired under each set of image acquisition conditions in said image signal acquisition step each are displayed with respective evaluation indexes on a screen ("obtaining the image of the position to be inspected in detail; classifying the obtained image; making a group of inspection data by the use of the information of classification of the image and the inspection condition corresponding to the image, and displaying the group of inspection data on a screen; and determining the inspection condition of the sample out of the group of inspection data displayed on the screen", Hamamatsu, paragraph 12, and sample displays in figure 5); and

a step in which inspection conditions are assigned on the screen presenting the plurality of images and respective evaluation indexes in said display step ("selection means for selecting the inspection condition of the sample out of the group of inspection data displayed on the screen with the inspection data making means", Hamamatsu, paragraph 15).

Regarding claim 23, Hamamatsu teaches wherein the plurality of images and respective indexes for evaluating each of the plurality of images are displayed in a list format ("In an analysis data compiling 50, the information of the group 41 of analysis data (classification of detected particles by category) obtained by the analysis

processing 40 is fed back to the group of inspection data 11 and the results thereof can be stored as a single unit in a storage device 60 as inspection data 51 and also displayed on a display device 61. That is, in the analysis data compiling 50, by feeding back the information of the group 41 of analysis data (classification of detected particles by category) to the data obtained from the group of inspection data 11, a group of inspection data 51a can be produced as the inspection data 51, for example, a group 51a of inspection data shown in FIG. 5.", Hamamatsu, paragraph 44 and figure 5).

Regarding claim 24, Hamamatsu teaches wherein the indexes for evaluating an image of a substrate surface are a plurality of kinds of indexes (Hamamatsu figures 10(a and b) and figure 11, Hamamatsu teaches a variety of indexes including "False Information", "Foreign Substance", Scratch and Defect").

Regarding claim 25, Hamamatsu discloses [a] method of inspecting defects, comprising:

a step of assigning an inspection recipe ("an operator can select, on a display screen, an optimal inspection condition for the sample 1 to be inspected among the group 10 of plural kinds of inspections and can set the selected inspection condition for an inspection apparatus", Hamamatsu, paragraph 45);

a step of inspecting a sample using the inspection recipe assigned ("the inspection apparatus can perform an inspection on the sample 1 to be inspected under the set optimal inspection condition", Hamamatsu, paragraph 45); and

a step of outputting results of the inspection (Hamamatsu, figure 1, reference 61, Hamamatsu displays his results);

wherein said step of assigning an inspection recipe further includes:

an image signal acquisition step in which, in a defect inspection tool, by varying a plurality of sets of image acquisition conditions differing from each other, image signals for each of said sets of image acquisition conditions are sequentially acquired from a required sample ("This group 10 of inspections includes the following inspection processes: (a) inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm), and the like by the use of the same inspection apparatus; (b) inspections are performed on the sample by the use of a plurality of inspection apparatuses of the same kind or approximately the same kind; (c) inspections are performed on the sample by the use of inspection apparatuses of different kinds (for example, an optical inspection apparatus shown in FIG. 2, an optical inspection apparatus shown in FIG. 3, an optical inspection apparatus shown in FIG. 4, or a SEM appearance inspection apparatus)", Hamamatsu, paragraph 41);

a storing step in which the plurality of images acquired in said image signal acquisition step, each image being different in image acquisition conditions, are stored in a form associated with information of the image acquisition conditions ("Still further, in the inspection apparatus A, as shown in FIG. 5, it is necessary to store in the storage device 113a a group 11a of inspection data, which is the results of inspection obtained

from the CPU 110a under a plurality inspection conditions Ta, Tb, Tc, . . .", Hamamatsu, paragraph 49);

a step in which image acquisition conditions are determined on the basis of the plurality of images acquired in said image signal acquisition step in a form associated with information of the image acquisition conditions, each image being different in image acquisition conditions ("As a result, it is possible to select the inspection apparatuses A, A' suitable for the sample 1 to be inspected, manufactured in a given manufacturing process, from the inspection data KaTa, Ka'Ta (51b) obtained for the respective inspection apparatuses. In the case of the preferred embodiment shown in FIG. 14, since the inspection apparatus A' can comparatively well detect foreign particles and scratches, the inspection apparatus A' comes to be selected. Here, at this time, by changing the inspection conditions in the same way for the respective inspection apparatuses A, A', the inspection accuracy can be improved to a suitable extent", Hamamatsu, paragraph 89);

a step in which images associated with the image acquisition conditions that were determined from the stored images are each processed by varying inspection conditions ("inspections are performed on the sample under a plurality of different inspection conditions of illuminating condition, detecting condition, image processing condition (condition of inspection algorithm)", Hamamatsu, paragraph 41, different algorithms are applied to the data); and

a step in which processing results on the images associated with inspection conditions and obtained by varying these inspection conditions are displayed on a

screen, whereby inspection conditions are newly assigned using information of the image-processing results displayed on the screen (Hamamatsu, figure 11, leftmost column lists inspection condition).

Regarding claim 26, Hamamatsu discloses wherein processing results on the images associated with the inspection conditions displayed on the screen and obtained by varying the inspection conditions include a graphical representation of indexes which denote attributes of each image ("FIG. 8 is an illustration to show inspection data obtained by inspecting a sample to be inspected under a plurality of inspection conditions", Hamamatsu, paragraph 25 and figure 8, the symbols displayed on the maps correspond to different inspection conditions).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 3, 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamatsu et al. (US 2001/0048761) in combination with Fujioka et al. (US 5,546,247).

Regarding claims 3, 13, and 19, Hamamatsu teaches all the elements in common with claims 1, 4 and 14 as described above.

Hamamatsu does not teach said image signal acquisition step, said defect detection step, and said classification step are each repeated a plurality of times under the same image acquisition conditions.

Fujioka, working in same problem solving area of metrology, does teach the concept of said image signal acquisition step, said defect detection step, and said classification step are each repeated a plurality of times under the same image acquisition conditions ("it is necessary to repeat the measurement several times and obtain an averaged result", Fujioka, column 2, line 24).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the statistical averaging technique of Fujioka to the inspection system of Hamamatsu "to reduce the effects due to noise" (Fujioka, column 2, line 23).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamatsu et al. (US 2001/0048761) in combination with Maetschke (US 6,771,804).

Regarding claim 7, Hamamatsu teaches all the elements common with claim 4.

Hamamatsu does not teach the classification of the defect candidates for each of said sets of image acquisition conditions is performed by analyzing a distribution of occurrence of defects on the sample.

Maetschke, working in the same problem solving area of signal classification does teach the classification of the defect candidates for each of said sets of image acquisition conditions is performed by analyzing a distribution of occurrence of defects on the sample ("a method of separating subject data from background data in a signal data set includes generating a frequency distribution of the subject data and background data based on a characteristic; identifying a maximum of the frequency distribution; establishing a first threshold to one side of the maximum; establishing a second threshold to another side of the maximum; and assigning data outside the first and second thresholds as one of the subject data and the background data", Maetschke, column 1, line 62, and figure 3).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to combine the classification by frequency analysis method of Maetschke with the inspection system of Hamamatsu to "more accurately separate a subject from the background. The method and apparatus would further accurately separate a subject from a background when the object is both lighter and darker than the background, and when the background includes a structured surface, dirt, shadows, etc. In addition, the method would be capable of handling images having great

variations in overall brightness by compensating for the overall brightness" (Maetschke, column 1, line 49).

9. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamatsu et al. (US 2001/0048761) in combination with Wienecke (US2001/0036306).

Regarding claims 8 and 16, Hamamatsu teaches all the elements common with claim 4.

Hamamatsu does not teach the classification of the defect candidates for each of said sets of image acquisition conditions is performed by judging whether a particular defect is a killer defect or a non-killer defect.

Wienecke working in the same field of endeavor of semiconductor inspection does teach the classification of the defect candidates for each of said sets of image acquisition conditions is performed by judging whether a particular defect is a killer defect or a non-killer defect ("classifying into critical and noncritical deviations", Wienecke, paragraph 21).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the classification method of Wienecke with the inspection system of Hamamatsu to help determine whether a wafer should be further processed or discarded ("Many of the deviations examined will turn out to be noncritical pseudo-defects, while the risk remains that a critical deviation will be regarded as a harmless pseudo-defect. The relevance of the conclusions reached in this manner, in terms of the decision as to whether a wafer can be released for further processing or must be discarded, is therefore unsatisfactory", Wienecke, paragraph 7, describing the need for an accurate appraisal of the severity of defects).

10. Claims 11, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamatsu et al. (US 2001/0048761) in combination with Hiroi et al.. (US 2002/0054703)..

Regarding claim 21, Hamamatsu teaches all the elements in common with claim 14.

Hamamatsu does not teach in said classification step, the detected defect candidates are classified into at least real defects and false defects.

Hiroi, working in the same field of endeavor of wafer inspection does teach in said classification step, the detected defect candidates are classified into at least real defects and false defects ("After completion of the defect classification mentioned

above, the user selects an operation display screen shown in FIG. 7, which comprises a map display part 55 for presenting an enlarged map including true defects 57, false defects 58 not to be detected and a current position indicator 59, and an image display part 56 for presenting an image corresponding to the current position indicator 59", Hiroi, paragraph 29, and figures 6 and 7).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the true and false defect classification method of Hiroi with the wafer inspection system of Hamamatsu to identify which defects are of interest and which can be safely ignored ("the user classifies the pattern defects 11 into true defects 57 and false defects 58 not to be detected", Hiroi, paragraph 28).

Regarding claim 11, the combination of Hamamatsu and Hiroi teaches wherein said step of assigning an inspection recipe further includes a step of displaying on a screen as a defect map the classification results obtained during classification in said classification step ("After completion of the defect classification mentioned above, the user selects an operation display screen shown in FIG. 7, which comprises a map display part 55 for presenting an enlarged map including true defects 57, false defects 58 not to be detected and a current position indicator 59, and an image display part 56 for presenting an image corresponding to the current position indicator 59", Hiroi, paragraph 29, and figures 6 and 7).

Regarding claim 17, the combination of Hamamatsu and Hiroi teaches wherein the classification results obtained during classification in said classification step are further displayed on a screen ("After completion of the defect classification mentioned above, the user selects an operation display screen shown in FIG. 7, which comprises a map display part 55 for presenting an enlarged map including true defects 57, false defects 58 not to be detected and a current position indicator 59, and an image display part 56 for presenting an image corresponding to the current position indicator 59", Hiroi, paragraph 29, and figures 6 and 7).

11. Claims 12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamatsu et al. (US 2001/0048761) in combination with Prince (US 6,738,505).

Regarding claims 12 and 18, Hamamatsu teaches the elements in common with claim 4 and duplicate claim 14.

Hamamatsu does not teach the step of presenting a review-sampling rate according to a category of defects classified in said classification step.

Prince, working in a similar field of endeavor of substrate inspection, does teach the step of presenting a review-sampling rate according to a category of defects classified in said classification step ("Also determined in Step 516 is whether processing parameters, including kernel geometry and the effective sampling rate, are optimized to

provide the maximum level of performance. If not, then the appropriate system parameters are adjusted in Step 518, and new parameters are inserted at Step 510", Prince, column 12, line 49, Prince tunes his system to best match the nature of the defects, i.e. a defect class, that he is looking for).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the sampling rate adjustment method of Prince with the inspection system of Hamamatsu "to provide the maximum level of performance" (Prince, column 12, line 52).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Obara et al. (US 7,113,628) teaches the use of multiple images displays and defect maps.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/TMR/

VIKKRAM BALI
PRIMARY EXAMINER